

## PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) TURBO SUPERCHARGERS FOR INTERNAL COMBUSTION ENGINES

(71) We, C.A.V. LIMITED, a British Company, of Well Street, Birmingham 19, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to turbo superchargers for internal combustion engines and of the kind comprising a turbine which in use, is driven by heated gases leaving the engine and a compressor which is driven by the turbine and which supplies air under pressure to the engine.

15 The object of the invention is to provide such a turbo supercharger in a simple and convenient form.

According to the invention a turbo supercharger of the kind specified comprises in 20 combination, a radial flow turbine rotor, a radial flow compressor rotor, a shaft mounting the rotors, a bearing housing for the shaft said bearing housing surrounding the shaft, a casing in which the bearing housing is mounted, said casing being divided 25 into two parts to permit the parts of the casing to be assembled to the bearing housing, means retaining the parts of the casing in assembled relationship, and a compressor 30 casing and a turbine casing in which the compressor and turbine rotors are located respectively, said compressor and turbine casings being secured to or at least in part formed integrally with the casing parts respectively, said means comprising a substantially U shaped clip which is engaged 35 over peripheral flanges formed on the casing parts respectively.

One example of a turbo supercharger in 40 accordance with the invention will now be described with reference to the accompanying drawing which shows a sectional side elevation of the unit.

With reference to the drawing there is 45 provided a radial flow turbine 10 and a [Price 25p]

radial flow compressor 11. The turbine includes a turbine rotor 12 which is located within a turbine casing 13 and in like manner the compressor has a rotor 14 located in a compressor casing 15. The 50 turbine casing has a tangential inlet (not shown) and an outlet 16 whilst the compressor casing has an inlet 17 and a tangential outlet (not shown).

The turbine rotor 12 is provided with 55 shaped blades 18 formed from hot pressed silicon nitride and these are mounted upon a boss 19 formed from similar material. The boss 19 is formed integrally with a shaft 20 and upon the remote end of this shaft is mounted the compressor rotor 14 this being secured upon the shaft by means of a retaining nut 21. Moreover, the boss 19 which tapers outwardly towards the shaft 60 includes an annular flange member 22.

Surrounding the shaft and intermediate the rotors is a sleeve 23 which is formed from silicon nitride and which is provided with passages through which air under pressure can be supplied so as to form an air 70 journal bearing for the shaft. The sleeve 23 is located within and forms part of a bearing housing 24. The bearing housing is of annular form, and within the housing is an annular recess 25. Apertures are provided to the exterior of the housing from the recess 25 and passages extend inwardly from the recess to communicate with the passages within the sleeve 23. In addition further passages 26 extend to the sides of 80 the housing to form air thrust bearings for the rotors and shaft.

The housing 24 at its ends is smaller in diameter than the remaining portion thereby to define a pair of steps and enclosing 85 the housing is a casing 27. The casing is formed in two parts having stepped internal peripheral surfaces which co-operate with the steps on the bearing housing. The parts of the casing are held in assembled rela- 90

tionship by means of a clip 28 of substantially U section which engages over a pair of peripheral flanges formed on the parts of the casing respectively. When in 5 assembled relationship a small gap exists between the parts of the casing.

The parts of the casing are in the example shown, formed integrally with halves of the adjacent compressor and turbine casings. The remaining halves of these casings are secured to the first mentioned halves respectively in any convenient manner and conveniently the parts and halves of the casings are formed from silicon nitride. The air under pressure for the bearings is derived from the interior of the compressor casing 15 and is supplied to the annular recess 25 by means of passages 29.

**20 WHAT WE CLAIM IS:—**

1. A turbo supercharger of the kind specified comprising in combination, a radial flow turbine rotor, a radial flow compressor rotor, a shaft mounting the rotors, a bearing 25 housing for the shaft said bearing housing surrounding the shaft, a casing in which the bearing housing is mounted, said casing being divided into two parts to permit the parts of the casing to be assembled to the bearing housing, means retaining the parts 30 of the casing in assembled relationship, and a compressor casing and a turbine casing in which the compressor and turbine rotors are located respectively, said compressor

and turbine casings being secured to or at 35 least in part formed integrally with the casing parts respectively, said means comprising a substantially U shaped clip which is engaged over peripheral flanges formed on the casing parts respectively. 40

2. A turbo supercharger as claimed in claim 1 in which the shaft and rotors are provided with air journal and thrust bearings respectively, the air for said bearings being derived from the compressor casing. 45

3. A turbo supercharger as claimed in claim 1 in which the bearing housing is of cylindrical form having annular steps defined at its ends respectively, the turbine and compressor casings having surfaces which 50 co-operate with said steps, and the casings extending axially towards each other, the axially adjacent ends being spaced apart and defining said peripheral flanges.

4. A turbo supercharger as claimed in 55 any of the preceding claims in which the bearing housing and the compressor and turbine casings are formed from silicon nitride.

5. A turbo supercharger comprising the 60 combination and arrangement of parts substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

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1,315,307 COMPLETE SPECIFICATION  
1 SHEETS  
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